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(54) **Garment shield**

Vorrichtung zum Schutz von Kleidung

Protection pour les vêtements

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Description

BACKGROUND OF THE INVENTION

The present invention relates to an absorbent pad in accordance with the preamble of claim 1 and to a process for producing an absorbent article in accordance with the preamble of claim 10. An absorbent pad of this type is known from US-A-4 059 114. This document discloses an elongate shield having a body-contacting surface with a pattern of spaced longitudinally extending line embossments impressed therein. The upper layer with its body-contacting surface comprises a nonwoven fibrous web formed of staple hydrophobic thermoplastic textile fibers unified by being coated with a water-insoluble rubbery fiber-binding resin so that all of the individual fibers are substantially covered with a resin coat, thus bonding them together at their crossing points by leaving the interstices of the web unfilled. Immediately below the body-contacting surface is a web for absorbing body fluid the web being formed of a blend of hydrophilic absorbent cellulose paper fluff and hydrophobic non absorbent textile fibers. A body fluid-impermeable layer of a blown microfiber web is juxta positioned to and coterminus with a web. The component parts of the shield are assembled in a special order and unified by heat-sealing with a metal die platen configured with a desired shape of the shield and line embossments thereon. Shields are then trimmed to shape and size along a heat seal line. Accordingly, the fluid flow is controlled by utilizing the wicking characteristics of the fibers by compressing them in line embossed patterns at the same time the shield edges are bonded.

The use of hydrophobic fibers for the body contacting layer allows fluid to pass through to the absorbent layer beneath yet will not retain moisture on the surface layer, thus providing greater comfort to the wearer by feeling dry for a longer period of time.

It is also possible to disperse into the absorbent layer a super absorbent polymer such as those taught by S. Dabi in U.S. Pat. No. 4,494,963, by I. S. Ness in U.S. Pat. No. 4,880,419 and by J. Roller in U.S. Pat. No. 4,443,492, which, pound for pound, absorb much greater quantities of fluid than pulp allowing for the manufacture of much thinner absorbent pads.

The liquid impermeable backing layer, located between the absorbent layer and the garment, is commonly made of polyethylene, polypropylene, or a like material to prevent leakage onto the wearer's garments. Such layers are taught in U.S. Pat. No. 4,731,066 by R. Korpman.

Viewing this prior art, however, it is readily apparent that little thought has been given toward keeping the fluid from migrating to the lateral and longitudinal edges of th absorbent pad. While transverse wicking takes plac , the design of the densified areas is such that the fluid is not prevented, in fact it may be encouraged, to flow away from the point of fluid introduction in the center of the pad to the edges of the pad increasing the chances of failure. While perimeter barriers have been taught by th prior art, there exists a n ed to wick fluid from the point of introduction on the pad yet still keep it compartmentalized so that it is prohibited, or at least hindered, from flowing toward the edge of the pad. The present invention meets this and other objectives as far as the pad is concerned, by the features of the characterizing portion of claim 1.

The disposable shield of the present invention comprises a thin, highly absorbent pad having a body-contacting surface, an absorbent layer, a liquid barrier, a positioning means for attaching the pad to an undergarment, and a release layer to protect the positioning means prior to use. The pad further comprises densified areas which have been made by fusing all pad layers together in a manner such that the interstitial space between the individual fibers in the densified areas is insufficient to readily allow fluid to flow through. The densified areas are made contiguous such that fluid, when introduced or deposited on the pad, will be prevented or hindered from flowing to the edges of the pad.

The present invention also involves a method of manufacturing the absorbent pad according to the teaching of claims 10 and 14 by applying heat and pressure to fuse all three layers of the pad - the body contacting layer, the absorbent layer, and the garment side layer - together to form fluid barriers in patterns which cause fluid to be compartmentalized on the pad, preventing or hindering its flow toward the pad edges.

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying diagrammatic drawings which illustrate the invention:

FIG. 1 is a plan view of one embodiment of a shield of the present invention;

FIG. 2 and 3 are plan views of two modified shield shapes;

FIG. 4 is an enlarged section taken along line 4-4 of FIG. 1, and

FIG. 5 is a photograph showing a greatly enlarged section of the fluid barriers.

FIG. 6 is a schematic drawing of the manufacturing process of the present invention.

FIG. 7 is a photograph showing side-by-side comparison of open ended embossing lines versus a closed inner barrier.

FIG. 8 is an enlarged cross-section of the pad of FIG. 4 that has been modified by the addition of a fibrous layer.

DETAILED DESCRIPTION OF THE INVENTION

Referring now more particularly to the drawings, FIG. 1 shows a pad 10 of the present invention in plan

view. The pad there shown has an outer fluid barrier 13 near the p rimeter of the pad and an inner fluid barrier 14 inwardly spaced from the outer fluid barrier 13. These fluid barriers serve to separate, or compartmentalize, the pad into distinct absorbing areas 15a and 15b. Other pads are shown in FIGS. 2 and 3 having variation in the design of the fluid barriers and the absorbing areas. Many others designs will suggest themselves.

The pad 10 is constructed with a cover layer 11 having a body-contacting surface 12. In one embodiment, cover layer 11 comprises a nonwoven fibrous web formed of staple hydrophobic textile fibers. Such fibers may be unified by being coated with a watery-insoluble rubbery fiber-binding resin so that all of the individual fibers are substantially covered with a resin coat, thus bonding them together at their crossing points while leaving the interstices of the web unfilled.

The cover layer 11 can also be made from a porous, substantially planar flexible polymeric coating on the surface of a bonded staple hydrophobic fiber web or the outermost surface of a lofty web of blended fibers in an integral pad construction. Such a surface, due to the flatness of the polymeric coating, has an unusually soft, smooth feeling and is pleasing to the touch.

It is, however, preferable that the fibers of cover layer 11 be thermoplastic or, more preferable, a mixture of two or more types of thermoplastic fibers having different melting points. Upon application of heat and pressure sufficient to melt at least one of the fiber types, the remaining unmelted fibers will be thermobonded or fused together into a porous web. This processing step is described more fully in U.S. Pat. No. 4,622,089, Lauritzen, hereby incorporated by reference.

The fibrous materials found to be satisfactory in the making of cover layer 11 have been found to be blends of two thermoplastic fibers having distinguishable melting temperatures. Bicomponent fibers, fibers with an inner core of a thermoplastic fiber, e.g., polyester, surrounded by an outer sheath of thermoplastic, e.g., polyethylene, having a melting point much lower than the core, have been found to be the best fibers to work with from processing and performance standpoints. Such fibrous materials are taught by U.S. Pat. No. 4,622,089, Lauritzen. It is also conceivable that the materials for cover layer 11 may be coformed blends of pulp fluff and thermoplastic fibers, e.g., polypropylene,

It has been found to be acceptable to use fibrous materials for cover layer 11 having a tex in the range of from about 9.0 to about 28.0 (about 1.0 to about 4.0 denier). Superior performance, from the standpoint of comfort, is believed to result from a tex of from about 12.5 to about 30.5 (about 1.5 to about 3.5 denier) or, most preferably, from a tex of about 12.5 to about 18.0 (about 1.5 to about 2.0 denier). Currently, commercialization is about to begin with a tex of 16.2 (1.8 denier).

Fiber length for cover layer 11 has been found to be satisfactory if in the range of from about 12.7 mm (0.5 inches) to about 63.5 mm (2.5 inches).

The resulting web is a thin, pliable, resilient, porous, cloth-like fabric whose top surface has a soft, smooth, pleasing, tactile quality. This web may be fed directly and continuously into the manufacturing process for the pad 10 of this invention. Or, it may be collected and stored for later use.

Referring to FIG. 4, it can be seen that immediately below and in heat bonded relationship with cover layer 11 is an absorbent layer 16 comprising a blend of thermoplastic fibers. It is preferable that the thermoplastic fibers of absorbent layer 16 be a mixture of two or more types of thermoplastic fibers having different melting points. Bicomponent fibers, fibers with an inner core of a thermoplastic fiber, e.g., polyester, surrounded by an outer sheath of thermoplastic, e.g., polyethylene, having a melting point much lower than the core, have been found to be the best fibers to work with from processing and performance standpoints. Like cover layer 11 above it, upon application of heat and pressure sufficient to melt at least one of the fiber types, the remaining unmelted fibers will be thermobonded or fused together into a porous web.

It is also preferable to include cellulosic pulp fibers with the thermoplastic fibers in absorbent layer 16. Since thermoplastic fibers, without further treatment, are essentially hydrophobic, absorbent layer 16 will not effectively draw fluid away from cover layer 11 absent some hydrophilic material. It is important to have sufficient pulp to absorb fluid. However, as will be described more fully below, it is also important to have a sufficient amount of thermoplastic fibers so that, when the layer is heat bonded (as will be described more fully below) there will be sufficient melting of thermoplastic to fill the interstitial void space in the web. An acceptable amount of pulp for effective absorbency is from about 20% to about 95% by weight. Conversely, an acceptable amount of thermoplastic fibers is from about 5% to about 80% by weight. A preferred amount of pulp would be in the range of from about 20% to about 60% by weight (with thermoplastic fibers being in the range of from about 40% to about 80%). A more preferred amount of pulp would be in the range of from about 20% to about 40% by weight (with thermoplastic fibers being in the range of from about 60% to about 80%).

Another way to characterize the ratio of thermoplastic to pulp is to look at the total amount of pulp and thermoplastic fibers in both cover layer 11 and absorbent layer 16. Since they are to be in heat bonded relationship, and (as will be described more fully below) it is desirable for some of the thermoplastic fibers in each layer to melt and fuse with each other, it is preferable that, when looking cover layer 11 together with absorbent layer 16, there is at least 35% by weight thermoplastic fibers. It is more preferable that there be at least 60% by weight thermoplastic fibers in both layers.

Upon formation of the absorbent lay r 16, the material may be fed directly and continuously into the manu-

facturing process for the pad 10 of this invention or it may be collected and used later. Bonding between the cover layer 11 and the absorbent layer 16 is accomplished by placing the layers in contact with each other and subjecting them to pressure and heat. This causes further melting of the fibers of the cover layer 11 and absorbent layer 16 resulting in thermobonding of the layers to each other upon cooling. This process is described more fully below.

It will, of course, be appreciated that the absorptive portion of the shield may be the central portion of an integrally formed pad member having a porous, planar, flexible polymeric coating as its top surface. In other embodiments of the present invention, the absorptive portion of the shield can utilize a variety of water immobilizing materials, e.g., superabsorbing polymers or peat moss, to increase fluid capacity or minimize pad bulk. Such materials are taught by Y. Levesque in U.S. Patent No. 4,507,122; S. Dabi in U.S. Pat. No. 4,494,963; by I. S. Ness in U.S. Pat. No. 4,880,419; by J. Roller in U.S. Pat. No. 4,443,492; hereby incorporated by reference.

The fibrous materials found to be satisfactory in the making of absorbent layer 16 are the same fibrous materials used for cover layer 11. Bicomponent polyester/polyethylene fibers have been found to be the best fibers to work with from processing and performance standpoints. Although it has been found that using fibers having a tex of about 16.2 (1.8 denier) in cover layer 11 results in improved comfort, it is not necessary to use fibers of this denier for absorbent layer 16. Although any tex in the range of from about 9.0 to about 28.0 (about 1.0 to about 4.0 denier) will suffice, from a cost standpoint a tex of from about 22.5 to about 31.5 (about 2.5 to about 3.5 denier) or more preferably, a tex of about 27.0 (3.0 denier) will yield good performance with acceptable manufacturing costs.

Fiber length for absorbent layer 16 has been found to be satisfactory if in the range of from about 12,7 mm to about 63,5 mm (about 0.5 inches to about 2.5 inches).

It is clear that the major distinctions between cover layer 11 and absorbent layer 16 is the presence of pulp in absorbent layer 16 and the possibility of finer tex (denier) fibers in cover layer 11. However, since the ranges for tex (denier) for each layer overlap, it is possible and acceptable to use the same tex (denier) fibers for both the cover layer 11 and absorbent layer 16. In such a case, there is no real need for two separate and distinct layers. Instead, it is possible to construct the pad using-one layer that has a body contacting surface and a surface which faces backing layer 17 (which is described in more detail below). In such a case, however, it is important to remember that the body contacting surface should be devoid of pulp. One of the main functions of the body contacting surface is to provide an essentially hydrophobic surface so that fluid will not remain at the surface but will instead be drawn to the absorbent material below. Therefore, when constructing a pad having one layer (instead of the two heretofore taught) the web should be laid with 100% thermoplastic fib rs for at least the first 0,0254 mm (mil). Thereafter, the mixtures of pulp and thermoplastic fibers taught above should be used.

Immediately beneath and in heat bonded relationship with absorbent layer 16 is a backing layer 17 in the form of a soft, pliable, fluid impermeable layer. Such layers can be either vapor permeable or vapor impermeable and are well known in the art. Such barriers are commonly a mixture of two thermoplastic materials such as polyethylene and low melt EVA. U.S. Pat. No. 4,731,066 by R. Korpman adequately teaches such backing layers and is hereby incorporated by reference.

Typically, the backing layer 17 is purchased and fed from rolls into the manufacturing process for pad 10. The backing layer 17 is brought into contact with the surface of absorbent layer 16 opposite the cover layer 11. Bonding between the backing layer 17 and the absorbent layer 16 is accomplished by subjecting them to pressure and heat. This causes further melting of the fibers of the absorbent layer 16 resulting in thermobonding of the layers to each other upon cooling. This bonding step, described more fully below, may be done at the same time as the bonding step between cover layer 11 and absorbent layer 16.

Improved contact between absorbent layer 16 and backing 17 would result if an adhesive coating were applied to either layer before they were put together. These adhesives are not necessary at the areas where pressure and heat is applied to bond the layers together. However, in those areas where bonding does not take place, adhesives will improve the contact between the layers. Such adhesives are well known in the art. An example would be U.S. Pat. No. 4,526,577,hereby incorporated by reference.

Applying adhesive to at least 20 percent of the surface area between absorbent layer 16 and backing layer 17 will result in adequate bonding. Preferably adhesive should be applied to at least 50 percent of the surface area. However, it should be noted that every incremental increase in adhesive coverage will either improve the contact, or at least make delayering less likely.

Positioner means 18, typically a pressure sensitive adhesive, is known in the art and is adequately taught in U.S. Pat. No. 4,554,191 by R. Korpman and in U.S. Pat. No. 4,335,026 by I. J. Balinth, hereby incorporated by reference. Positioner means 18 is a pressure sensitive adhesive that keeps the pad properly positioned on the wearer's underpants during use. It is attached to backing layer 17 and, for packaging is covered with a release paper 19 that is easily removed just prior to use.

In order for the adhesive of positioner means 18 to function effectively under the conditions to which it is subjected and on the fabrics it will be contacting, not only is the selection of the adhesive its If important but also the intricat adhesive system must be balanced as

to surface adhesion, compliancy, coating weight, backing adhesion and backing strength. To remove cleanly from the garment to which it is attached, the adhesive bond to the garment surfac must be weaker than the cohesive strength of the adhesive per se, the bond strength of the adhesive to its backing material, and the intrinsic strength of the composite structure.

The positioner means preferably comprises a moisture vapor permeable adhesive which can be securely attached to fabrics normally made into undergarments and is capable of being easily removed therefrom without fabric damage or leaving noticeable adhesive residue thereon.

Disposal of the pad can be accomplished by rolling the body contacting surface to the inside and securing it with the adhesive backing.

The component parts of the pad 10 are assembled according to the schematic diagram illustrated in FIG. 6 and unified by heat-sealing with a metal die platen configured with the desired shape of the pad and fluid barriers 13 and 14. Pad 10 is then trimmed to shape and size along the outer fluid barrier 13.

The process begins by placing cover layer 11 and absorbent layer 16 together. The two layers may, optionally, be fed into a pattern embosser 21 which prints a pattern onto the cover layer 11. The backing layer 17 is then fed to the cover layer/absorbent layer combination. For secure contact, an adhesive may be applied 22 just prior to applying the backing layer 17. If adhesive is applied it is preferred that the three layers be subjected to slight pressure to assure adequate contact between the backing layer 17 and the absorbent layer 16.

The pad material, shown in FIG. 6 as 23, is then fed into a sealing station 24 where pressure and heat are applied. The pressure and heat are controlled such that the temperature exceed the lower melting point of the thermoplastic materials in cover layer 11, absorbent layer 16, and backing layer 17, but does not exceed the melting point of the remaining thermoplastic materials in each of the three layers.

It is important to note that, while higher temperatures and pressures are beneficial from the standpoint of fusing the layers together, if the temperature and/or pressure is too high pin holes will develop in the pad structure which will lead to failure. For instance, in the case producing 400-600 pads per minute, each pad comprised of polyester/polyethylene bicomponent fibers, it is important to keep the temperature the lower (pattern) roll of sealing station 24 within the range of from about 93.33°C (200°F) to about 204.44°C (400°F), preferably from about 121.11°C (250°F) to about 176.67°C (350°F); and it is important to keep the temperature of the upper (anvil) roll within the range of from about 37.78°C (100°F) to about 93.33°C (200°F), preferably from about 51.67°C (125°F) to about 79.44°C (175°F). Further, it is important to keep the pressure within the range of from about 689.467 x 10^3 Pa (100) to about 4136.802 x 10^3 Pa (600 psi), preferably within the range of from about 1378.934 x 10^3 Pa (200) to about 3447.335 x 10^3 Pa (500 psi).

Another related variable is the gap distance between the roll with the barrier seal mold and the anvil roll. As the gap distance decreases, fusing between the layers of the pad improves. However, at the same time the possibility of developing pin holes also increases. Therefore, in the case of polyester/polyethylene bicomponent fibers, it is important to keep the gap distance within the range of from about 0.254 mm (0.01) to about 0.508 mm (0.02 inches).

The outer barrier 13 and the inner barrier 14 formed from the application of pressure and heat are densified areas preferentially devoid of any interstitial bore space. As one of the thermoplastic fiber materials melts, the pressure forces it into the pore space, reducing the ability of the densified area to draw fluid into and through it by capillary action.

Positioning adhesive is then applied at 25 and release paper 19 is then applied at 26. The pad material is then fed into a cutting station 27, shown in FIG. 6 as a rotary operation. Thereafter, excess trim material is removed at 28 and the final pad 10 is sent for packaging.

It should be noted that pad 10 may be trimmed as close to outer fluid barrier 13 as possible without actually removing any of the fused material in the barrier. However, it is preferential to leave some portion of unfused material along the outer perimeter. This unfused material is less dense and softer than the fused barrier and is considerably softer to the touch.

Referring to FIG. 8, an additional fibrous layer 16a may also be employed which is placed between absorbent layer 16 and backing layer 17. To understand the advantages of such an additional layer, it is first necessary to review the basic process.

As shown above and in FIG. 6, the normal manufacturing process for pads of this type involves first laying down a hydrophobic layer and applying heat to fuse the fibers into a web. An absorbent layer and a backing layer are then laid on top of the hydrophobic layer. In such a situation, the hydrophobic layer (intended to be the body-side layer) becomes needlessly compressed and stiff.

If a second hydrophobic layer, made from the same material as the first hydrophobic layer, is laid onto the absorbent layer, an advantageous result occurs. The second hydrophobic layer is not as compressed as the first hydrophobic layer and is softer to the touch. A backing layer can then be applied to the more compressed hydrophobic layer and the less compressed hydrophobic layer can become a softer, more pleasing body-side layer.

There is also an additional benefit. Pulp fluff is very dusty. By sandwiching the absorbent layer containing pulp between two fibrous thermoplastic layers, the dust in the operating environment is greatly reduced.

The manufacturing steps in this event are slightly

different from those previously described in connection with FIG. 6. Firstly, fibrous layer 16a is laid onto absorbent layer 16 which is then laid onto layer 11. Then, backing layer 17 is applied to layer 16a. In such an arrangement, layer 16a then becomes the body-side, cover layer, layer 16a becomes merely a support layer between absorbent layer 16 and backing 17.

EXPERIMENTAL DATA

A comparison was made between the pad of the present invention (without layer 16a) and that of the closest prior art - U.S. Pat. No. 4.059,114, Richards.

Richards provides for longitudinally oriented line embossments that open at the longitudinal ends of the pad. Therefore, a side-by-side comparison was made to view the flow of fluid that was introduced in the pad of Richards and that of the present invention.

Two pads were prepared, shaped identically overall. In one, line embossments were placed which were open on the longitudinal ends. In the second, an inner barrier seal was placed which was closed. Two ml. of fluid was placed on each pad at a contact site half way between the center of the pad and one longitudinal end. After ten minutes a photograph, FIG. 7, was taken to illustrate how the fluid had dispersed in the pads.

In the pad with the open line embossments, it can be clearly seen that fluid has extended past the ends of the line embossments and is extending toward the longitudinal ends. Also, it can be clearly seen that fluid has flowed around the end of the rightmost embossment line to the perimeter seal. In the pad with the closed inner barrier, however, the fluid is clearly contained within the innermost seal with no pressure on the outer seal.

Claims

1. An absorbent pad (10) comprising:

   a fibrous, body-side, cover layer (11);
   a fluid impermeable, garment-side backing layer (17); and
   a fibrous absorbent layer (16) therebetween; wherein the cover layer (11) and the absorbent layer (16) are each comprised of thermoplastic fibers, and wherein the cover layer (11), the backing layer (17), and the absorbent layer (16) are thermally bonded to each other at the perimeter;
   characterized in that
   the cover layer (11), the absorbent layer (16) and the backing layer (17) are each comprised of at least two thermoplastic materials having distinguishable melting points, and wherein the cover layer (11), the backing layer (17), and the absorbent layer (16) are thermally bonded to each other also in the center of the pad (10) in such a way that the pad has two or more compartmentalized areas (15a, 15b, 15c, 15d) for absorbing liquids and that the bonding of the different layers (11, 16, 17) takes place to such an extent that the fluid is at least hindered from flowing toward the edge of the pad (10).

2. The absorbent pad of claim 1 wherein the at least two thermoplastic materials in the cover (11) and absorbent layers (16) comprise bicomponent fibers.

3. The absorbent pad of claim 1 which further comprises a layer (16a) positioned between the absorbent layer (16) and the backing layer (17) which additional layer (16a) is comprised of thermoplastic fibers.

4. The absorbent pad of claim 2 wherein the bicomponent fibers are comprised of a polyester core surrounded by a sheath of polyethylene.

5. The absorbent pad of claim 1 wherein the absorbent (16) is further comprised of pulp fluff.

6. The absorbent pad of claim 5 wherein the pulp fluff is present in amounts ranging from about 20% to about 60% by weight and the at least two thermoplastic materials are present in amounts ranging from about 40% to about 80% by weight.

7. The absorbent pad of claim 5 wherein the pulp fluff is present in amounts ranging from about 20% to about 40% by weight and the at least two thermoplastic materials are present in amounts ranging from about 60% to about 80% by weight.

8. The absorbent pad of claim 1 wherein the Tex (denier) of the fiber in the cover layer (11) is from about 9.0 (1.0) to about 28.0 (4.0).

9. The absorbent pad of claim 8 wherein the Tex (denier) of the fiber in the absorbent layer (16) is from about 9.0 (1.0) to about 28.0 (4.0).

10. A process for producing an absorbent article comprising the steps of:

    a. combining (i) a fibrous body-side, cover layer (11) comprising thermoplastic fibers, (ii) a fluid impermeable, garment-side backing layer (17) and (iii) a fibrous absorbent layer (16) comprising thermoplastic fibers, wherein the absorbent layer (16) is positioned between the cover layer (11) and the backing layer (17) and
    b. subjecting the cover layer (11), absorbent layer (16), and backing layer (17) to heat and pressure to thermally bond said layers to each other at the perimeter,

characterized by

c. combining in step a. (i) a body-side cover layer (11) comprising a mixture of at least two thermoplastic materials having distinguishable m lting points, (ii) a fluid-impermeable, garment-side backing layer (17) having at least two thermoplastic materials having distinguishable melting points, and (iii) an absorbent layer (16) comprising a mixture of at least two thermoplastic materials having distinguishable melting points; and

d. forming contiguous, densified liquid barrier areas (15a, 15b, 15c) by subjecting the cover layer (11), absorbent layer (16), and backing layer (17) to heat and pressure in a sealing station (24) sufficient to fuse lower melting point thermoplastic materials in the cover, absorbent, and backing layers (11, 16, 17) in a manner such that the flow of fluid to the edges of the article is prohibited or at least hindered; wherein said pressure and temperature are balanced to fuse the cover layer (11), absorbent layer (16), and backing layer (17) together while avoiding the formation of pinholes in the backing layer (17).

11. The process of claim 10 wherein the heat is supplied by said pattern roll (21) having a temperature of about 93.3 °C (200 °F) to about 204 °C (400 °F) and said anvil roll (24) having a temperature of about 37.8 °C (100 °F) to about 93.3 °C (200 °F).

12. The process of claim 10 wherein the pressure is in the range of 689,467 . 10^3 Pa to about 4136,802 . 10^3 Pa (100 to about 600 psi).

13. The process of claim 10 further comprising the step of trimming excess material proximate the densified liquid barrier areas (13) to form an absorbent pad (10).

Patentansprüche

1. Absorptionskissen (10), umfassend:

eine faserhaltige, körperseitige Deckschicht (11),
eine fluidundurchlässige, kleidungsseitige Rückschicht (17); und
eine dazwischenliegende faserige Absorptionsschicht (16), wobei die Deckschicht (11) und die Absorptionsschicht (16) jeweils thermoplastische Fasern enthalten und wobei die Deckschicht (11), die Rückschicht (17) und die Absorptionsschicht (16) miteinander am Umfang heißversiegelt sind,
dadurch gekennzeichnet, daß
die Deckschicht (11), die Absorptionsschicht (16) und die Rückschicht (17) jeweils mindestens zwei thermoplastische Materialien mit unterscheidbaren Schmelzpunkten aufweisen, wobei

die Deckschicht (11), die Rückschicht (17) und die Absorptionsschicht (16) auch im Zentrum des Kissens (10) derart miteinander heißversiegelt sind, daß das Kissen zwei oder mehr unterteilte Bereiche (15a, 15b, 15c, 15d) zum Absorbieren von Flüssigkeiten aufweist und daß die Verbindung der verschiedenen Schichten (11, 16, 17) in einem solchen Umfang stattfindet, daß ein Fließen des Fluids zu dem Rand des Kissens (10) zumindest behindert wird.

2. Absorptionskissen nach Anspruch 1, bei dem die zumindest zwei thermoplastischen Materialien in der Deckschicht (11) und der Absorptionsschicht (16) Bikomponenten-Fasern aufweisen.

3. Absorptionskissen nach Anspruch 1, welches weiterhin eine Schicht (16a) aufweist, die zwischen der Absorptionsschicht (16) und der Rückschicht (17) angeordnet ist, wobei die zusätzliche Schicht (16a) thermoplastische Fasern enthält.

4. Absorptionskissen nach Anspruch 2, bei dem die Bikomponenten-Fasern einen Polyesterkern aufweisen, der von einer Polyethylenhülle umgeben ist.

5. Absorptionskissen nach Anspruch 1, bei dem die Absorptionsschicht (16) weiterhin Pulpeflocken enthält.

6. Absorptionskissen nach Anspruch 5, bei dem die Pulpeflocken in einer Menge von etwa 20 Gew.-% bis etwa 60 Gew.-% und die zumindest zwei thermoplastischen Materialien in einer Menge von etwa 40 Gew.-% bis etwa 80 Gew.-% vorhanden sind.

7. Absorptionskissen nach Anspruch 5, bei dem die Pulpeflocken in einer Menge von etwa 20 Gew.-% bis etwa 40 Gew.-% und die zumindest zwei thermoplastischen Materialien in einer Menge von etwa 60 Gew.-% bis etwa 80 Gew.-% vorhanden sind.

8. Absorptionskissen nach Anspruch 1, bei welchem das Tex (Denier) der Faser in der Deckschicht (11) von etwa 9,0 (1,0) bis etwa 28,0 (4,0) beträgt.

9. Absorptionskissen nach Anspruch 8, bei welchem das Tex (Denier) der Faser in der Absorptionsschicht (16) von etwa 9,0 (1,0) bis etwa 28,0 (4,0) beträgt.

10. Verfahren zum Herstellen eines absorbierenden Artikels, welches die folgenden Schritte umfaßt:

a. Zusammenfügen von (i) einer faserhaltigen, körperseitigen Deckschicht (11), die thermoplastische Fasern enthält, (ii) einer fluidundurchlässigen, kleidungsseitigen Rückschicht (17) und (iii) einer faserhaltigen Absorptionsschicht (16), die thermoplastische Fasern enthält, wobei die Absorptionsschicht (16) zwischen der Deckschicht (11) und der Rückschicht (17) angeordnet wird, und

b. die Deckschicht (11), die Absorptionsschicht (16) und die Rückschicht (17) werden Hitze und Druck unterworfen, um die Schichten miteinander am Umfang heißzuversiegeln, gekennzeichnet durch

c. das Zusammenfügen in Schritt a. (i) einer körperseitigen Deckschicht (11), die eine Mischung von mindestens zwei thermoplastischen Materialien mit unterscheidbaren Schmelzpunkten aufweist, (ii) einer fluidundurchlässigen, kleidungsseitigen Rückschicht (17) mit mindestens zwei thermoplastischen Materialien mit unterscheidbaren Schmelzpunkten und (iii) einer Absorptionsschicht (16), die eine Mischung von mindestens zwei thermoplastischen Materialien mit unterscheidbaren Schmelzpunkten aufweist, und

d. das Ausbilden von zusammenhängenden verdichteten Flüssigkeitssperrbereichen (15a, 15b, 15c), indem die Deckschicht (11), die Absorptionsschicht (16) und die Rückschicht (17) Wärme und Druck in einer Siegelstation (24) hinreichend ausgesetzt werden, um die thermoplastischen Materialien mit einem geringeren Schmelzpunkt in der Deckschicht, der Absorptionsschicht und der Rückschicht (11, 16, 17) derart zu verschmelzen, daß der Fluß eines Fluides zu den Rändern des Artikels verhindert oder zumindest behindert wird, wobei der Druck und die Temperatur so aufeinander abgestimmt werden, daß die Deckschicht (11), die Absorptionsschicht (16) und die Rückschicht (17) miteinander verschmolzen werden, während die Bildung von feinen Löchern in der Rückschicht (17) vermieden wird.

11. Verfahren nach Anspruch 10, bei dem die Wärme durch die Musterrolle (21) mit einer Temperatur von etwa 93,3 °C (200 °F) bis etwa 204 °C (400 °F) und die Amboßrolle (24) mit einer Temperatur von etwa 37,8 °C (100 °F) bis etwa 93,3 °C (200 °F) zugeführt wird.

12. Verfahren nach Anspruch 10, bei dem der Druck in dem Bereich von 689,467 · 10^3 Pa bis etwa 4136,802 · 10^3 Pa (100 bis etwa 600 psi) liegt.

13. Verfahren nach Anspruch 10, welches weiterhin den Schritt des Beschneidens von überschüssigem Material in der Nähe der verdichteten Flüssigkeitssperrbereiche (13) zum Bilden eines absorbierenden Polsters (10) umfaßt.

Revendications

1. Un molleton absorbant (10) comprenant :

   une couche de dessus (11), fibreuse, faisant face au corps ;
   une couche de dessous (17) imperméable aux fluides, faisant face aux vêtements ; et
   entre celles-ci, une couche absorbante fibreuse (16) ;
   dans lequel la couche de dessus (11) et la couche absorbante (16) sont chacune composées de libres thermoplastiques, et dans lequel la couche de dessus (11), la couche de dessous (17) et la couche absorbante (16) sont liées thermiquement les unes aux autres au niveau du périmètre
   caractérisé en ce que
   la couche de dessus (11), la couche absorbante (16) et la couche de dessous (17) sont chacune composées d'au moins deux matériaux thermoplastiques ayant des points de fusion distincts, et dans lequel
   la couche de dessus (11), la couche de dessous (17) et la couche absorbante (16) sont thermiquement liées les unes aux autres également au centre du molleton (10) de telle sorte que le molleton comprend deux ou plusieurs zones compartimentées (15a, 15b, 15c, 15d) pour absorber les liquides et de telle sorte que la liaison des différentes couches (11, 16, 17) se produise dans une mesure telle que le fluide est au moins empêché de couler vers le bord du molleton (10).

2. Le molleton absorbant selon la revendication 1, dans lequel les matériaux thermoplastiques de la couche de dessus (11) et de la couche absorbante (16), qui sont au moins deux, comprennent des fibres à deux composants.

3. Le molleton absorbant selon la revendication 1 comprenant en outre une couche 16a positionnée entre la couche absorbante (16) et la couche de dessous (17), ladite couche supplémentaire (16a) étant composée de fibres thermoplastiques.

4. Le molleton absorbant selon la revendication 2, dans lequel les fibres à deux composants sont composées d'une partie centrale en polyester entourée d'une gaine de polyéthylène.

5. Le molleton absorbant selon la revendication 1, dans lequel la couche absorbante (16) est en plus

composée de pulpe ouatée.

6. Le molleton absorbant selon la revendication 5, dans lequel la pulp ouatée est présente dans des quantités comprises dans la gamme allant d'environ 20 % à environ 60 % en masse, et dans lequel les matériaux thermoplastiques qui sont au moins deux sont présents dans une quantité comprise dans la gamme allant d'environ 40 % à environ 80 % en masse.

7. Le molleton absorbant selon la revendication 5, dans lequel la pulpe ouatée est présente dans des quantités comprises dans la gamme allant d'environ 20 % à environ 40 % en masse, et dans lequel les matériaux thermoplastiques qui sont au moins deux sont présents dans une quantité comprise dans la gamme allant d'environ 60 % à environ 80 % en masse.

8. Le molleton absorbant selon la revendication 1, dans lequel le Tex (denier) de la fibre dans la couche de dessus (11) est d'environ 9,0 (1,0) à environ 28,0 (4,0).

9. Le molleton absorbant selon la revendication 1, dans lequel le Tex (denier) de la fibre dans la couche absorbante (16) est d'environ 9,0 (1,0) à environ 28,0 (4,0).

10. Un procédé de production d'un article absorbant comprenant les étapes consistant à :

a) combiner (i) une couche de dessus (11), fibreuse et faisant face au corps, comprenant des fibres thermoplastiques, (ii) une couche de dessous (17) imperméable aux fluides et faisant face aux vêtements, et (iii) une couche absorbante fibreuse (16) comprenant des fibres thermoplastiques, dans lequel la couche absorbante (16) est placée entre la couche de dessus (11) et la couche de dessous (17), et

b) soumettre la couche de dessus (11), la couche absorbante (16) et la couche de dessous (17) à la chaleur et à la pression afin de lier thermiquement lesdites couches les unes aux autres au niveau du périmètre,
caractérisé par

c) le fait de combiner dans le cadre de l'étape a. (i) une couche de dessus faisant face au corps (11) comprenant un mélange d'au moins deux matériaux thermoplastiques ayant des points de fusion distincts, (ii) une couche de dessous (17) imperméable aux fluides t faisant face aux vêtements ayant au moins deux matériaux (thermoplastiques ayant des points de fusion distincts, et (iii) une couche absorbante (16) comprenant un mélange d'au moins deux matériaux thermoplastiques ayant des points de fusion distincts ; et

d) le fait de former des zones de barrière aux liquides densifiées et contiguës (15a, 15b, 15c) en soumettant la couche de dessus (11), la couche absorbante (16) et la couche de dessous (17) à la chaleur et à la pression dans un poste de scellage (24), ladite chaleur et ladite pression étant suffisante pour fusionner les points de fusion les plus bas des matériaux thermoplastiques dans les couches de dessus, absorbante et de dessous (11, 16, 17) de telle sorte que le flux de fluide vers les bords de l'article est empêché ou au moins entravé ; dans lequel ladite pression et la température sont équilibrées afin de fusionner ensemble la couche de dessus (11), la couche absorbante (16) et la couche de dessous (17) tout en évitant la formation de trous d'épingles dans la couche de dessous (17).

11. Le procédé selon la revendication 10, dans lequel la température est fournie par ledit rouleau à motifs (21) ayant une température allant d'environ 93,9°C (200°F) à environ 204°F (400°F) et ledit rouleau matrice (24) ayant une température allant d'environ 37,8°C (100°F) à environ 93,3°C (200°F).

12. Le procédé selon la revendication 10, dans lequel la pression est comprise dans la gamme allant d'environ 689.467 • 10^3 Pa à environ 4136.802 • 10^3 Pa (100 à environ 600 psi).

13. Le procédé selon la revendication 10, comprenant en outre l'étape consistant à éliminer le matériau en excès à proximité des zones de barrière aux liquides densifiées (13) afin de former un molleton absorbant (10).

FIGURE 1

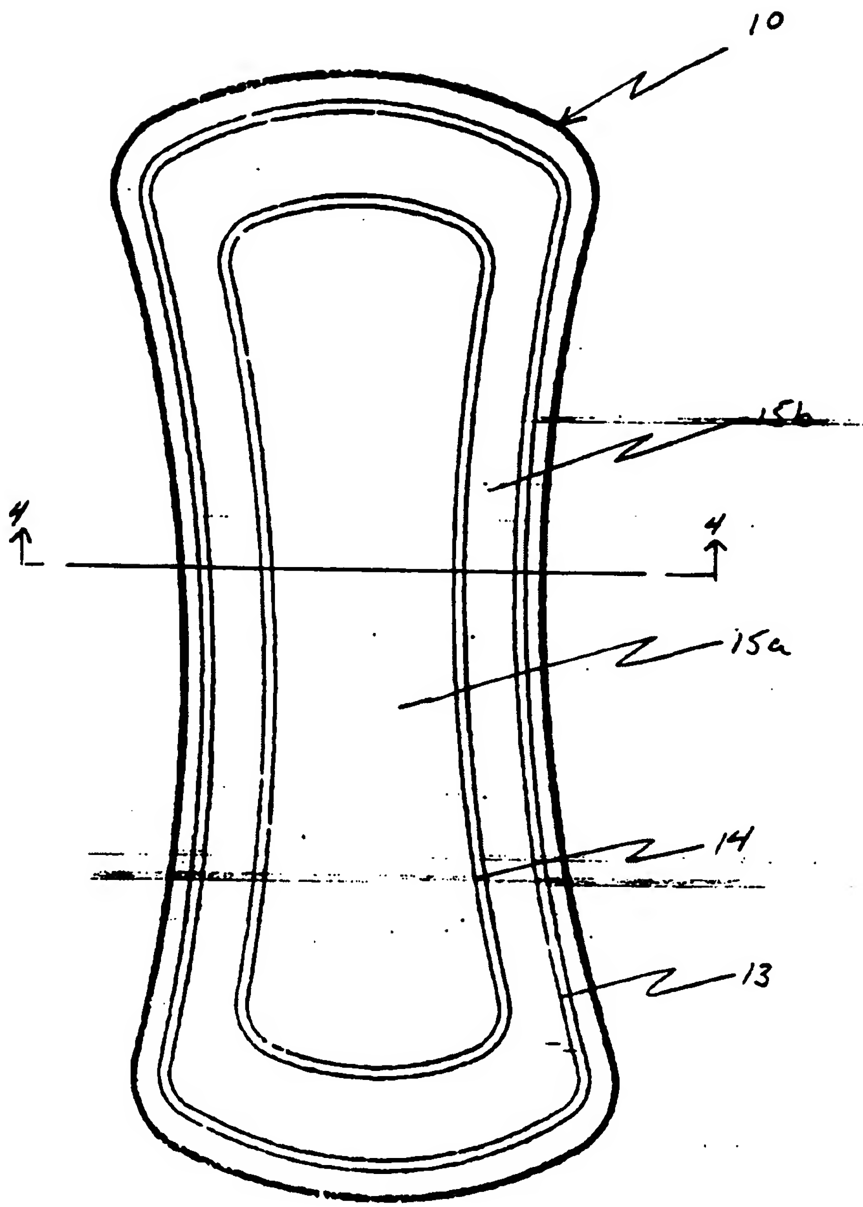


FIGURE 2

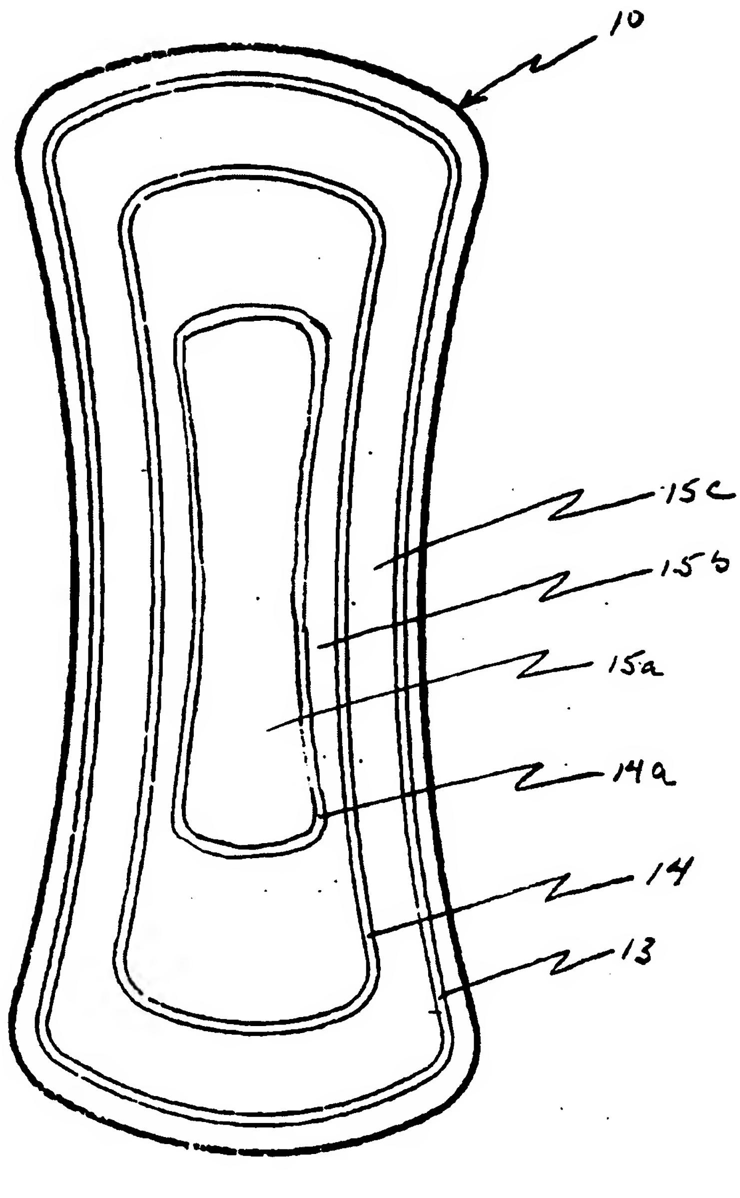
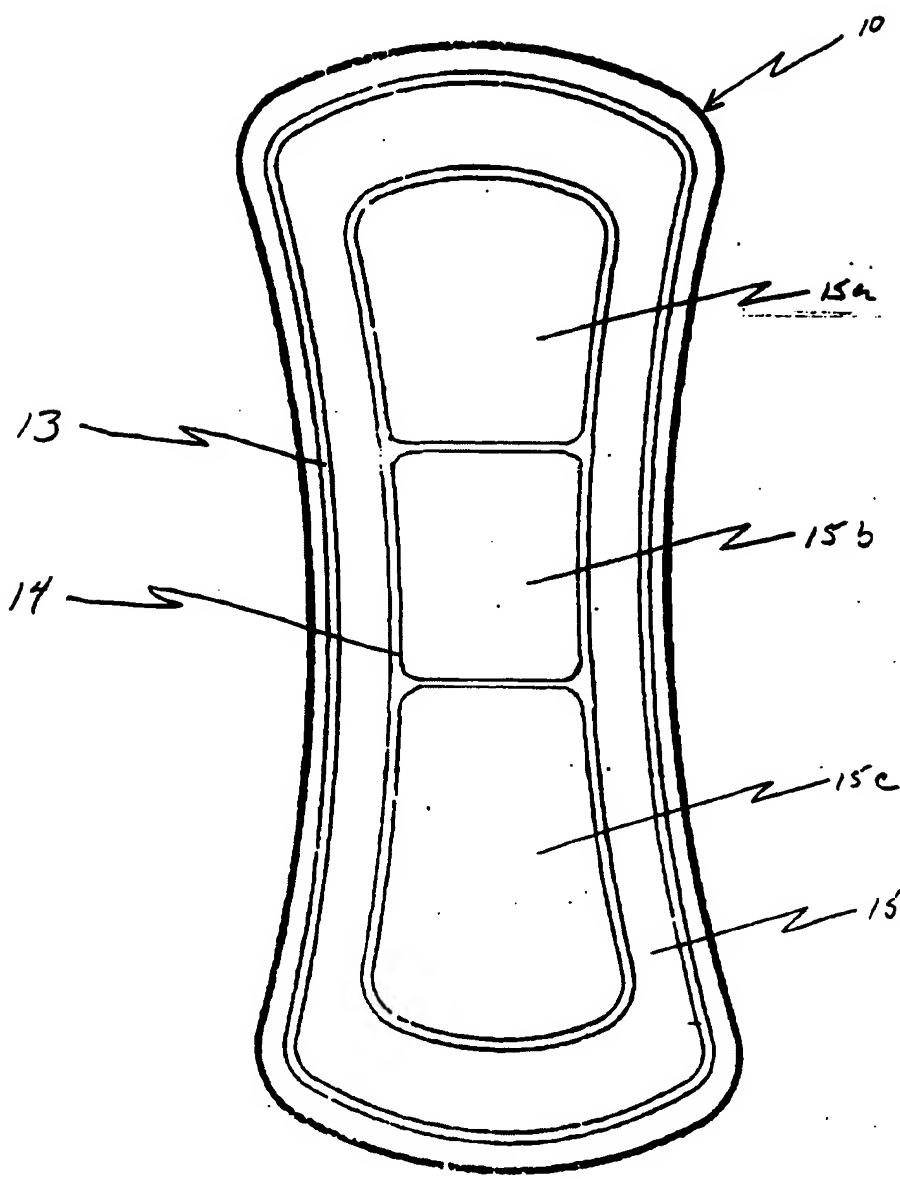


FIGURE 3



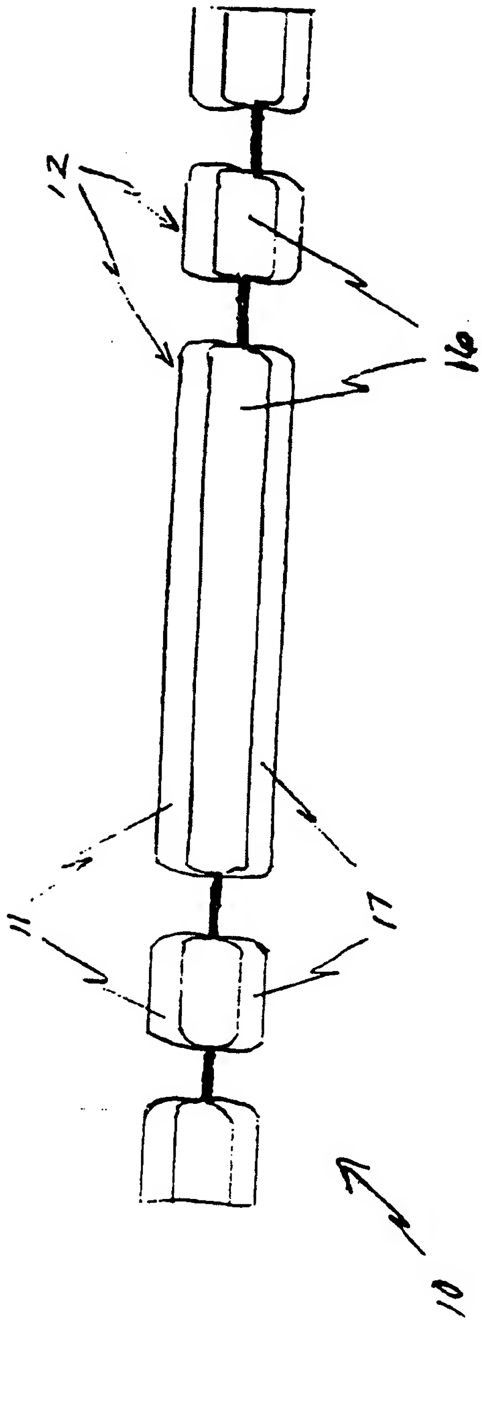
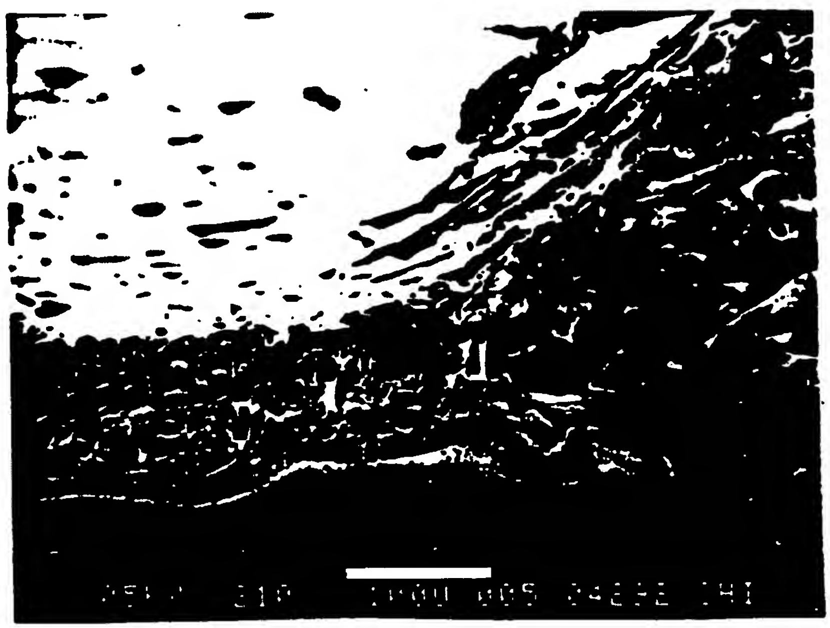


FIGURE 4

FIGURE . 5



Cross Section of Pantyliner With
Inner Barrier Seal (210X)

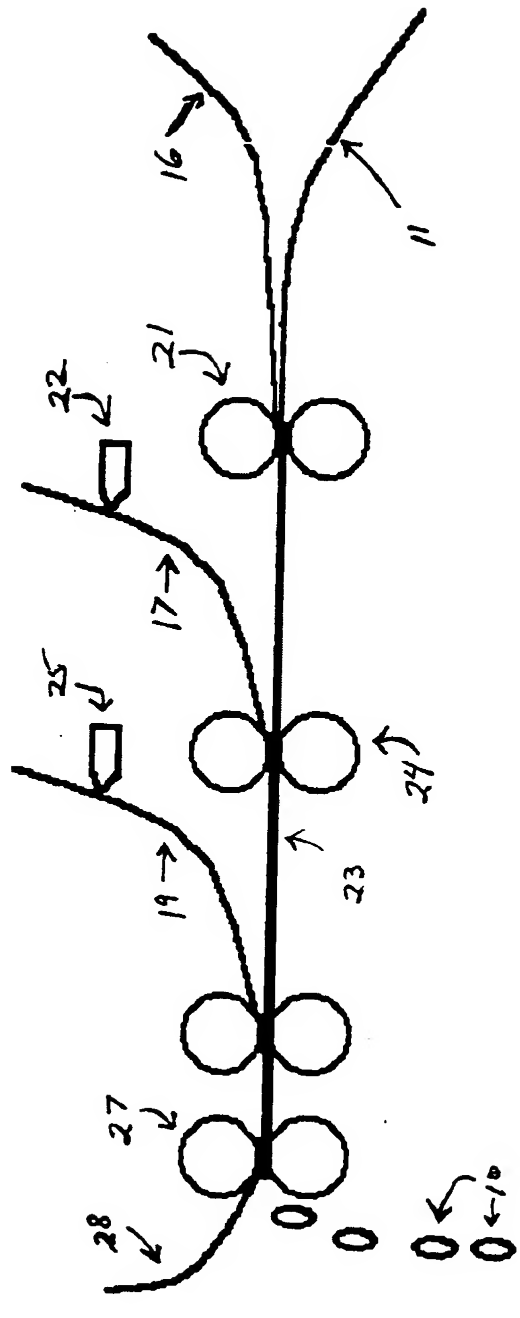
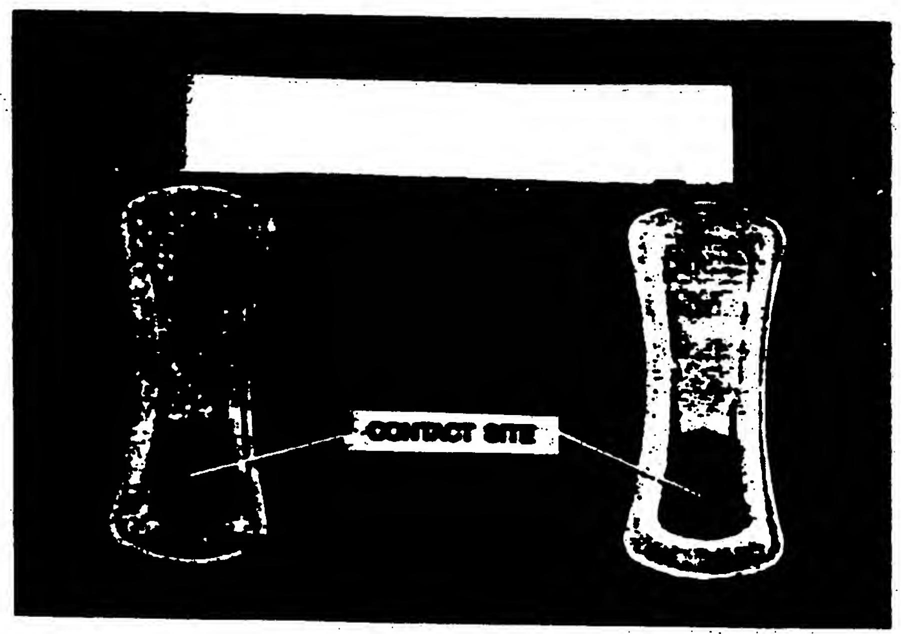


FIGURE 6

FIGURE 7



Open Barrier
Seal Design

Closed Barrier
Seal Design

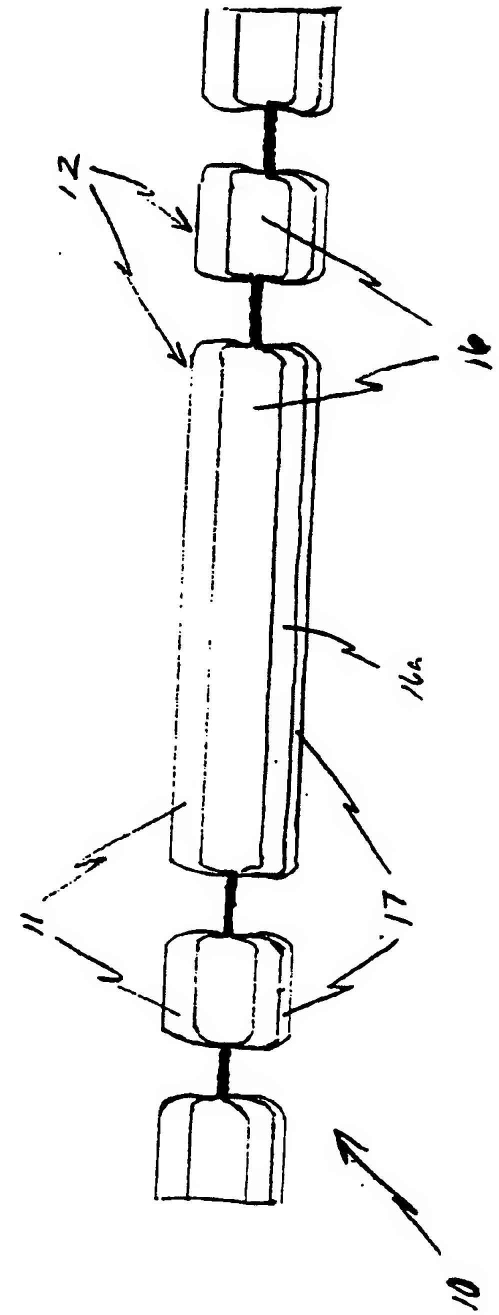


FIGURE 8